# An Overview of the U.S. EPA's Small Systems Research and Development Center at the EPA Test & Evaluation Facility in Cincinnati, Ohio

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## Objectives

- Select and evaluate Small System technology
- Share results (technology transfer)
- Support Small Systems operation through field demonstrations
- Address water quality issues:
  - Variation in source water quality (rivers, streams, lakes, groundwater)
  - Contaminants (viruses, bacteria, parasites, toxic chemicals)

## Environmental Relevance

The federal and state drinking water regulatory requirements pose a serious challenge to Small System operators that often do not have the technical, managerial, or financial resources. The research conducted by U. S. EPA at the Test and Evaluation (T&E) Facility in Cincinnati, Ohio, focuses on assisting small system operators to:

- Understand the different approaches to treating, distributing and maintaining the drinking water quality to meet the regulatory requirements
- Identify and select appropriate technology based on knowledge and understanding of: contaminants, available treatment technology, distribution system fundamentals and applicable regulations
- Refine the selection and operation of various treatment technologies based on source water, available funding, vendor support and ease of operation
- Implement "packaged" solutions by combining conventional treatment technology with remote monitoring and control

## U.S. EPA Test & Evaluation (T&E) Facility

- Multifaceted research facility (lab and pilot-scale Small Systems)
- Collaborative research with Academia, Industry, and other Agencies

*EPA T&E Facility, Cincinnati, Ohio*

## T&E Small Systems Technology

- Filtration and Water Reuse
  - Bag and Cartridge Filtration
  - Ultrafiltration
  - Sand Filtration
  - Ceramic Filtration

*Bag Filters in Series*

*Cartridge Filters and Housings*

*Ultrafiltration System*

*Sand Filtration Unit*

*Ceramic Filter*

- Disinfection and Byproducts
  - Conventional Disinfection (Free Chlorine, Chloramine, Chlorine Dioxide)
  - Alternative Disinfectants and Oxidants (On-Site Chlorine Generators, UV/Ozone/Hydrogen Peroxide)
- Distribution Systems Simulation
- Point-of-Use Treatment
  - Reverse Osmosis Units
  - Activated Carbon Filters
  - Iodinated Resins

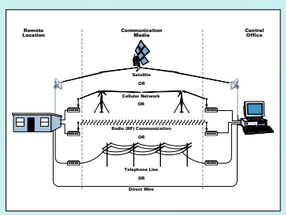
*On-Site Chlorine Generator*

*UV/Ozone/Hydrogen Peroxide Research*

*Distribution Systems Simulation*

*Point-of-Use Reverse Osmosis Unit*

- Remote Monitoring and Control
  - Centralizing multiple Small Systems operations
  - Enhanced troubleshooting
  - Satisfying regulatory record keeping and reporting




*Remote Monitoring and Control*

## Field Demonstrations and Outreach

South America, China, Indian Reservations, EM Federal - 8a Firm, Regions, Agencies, and States

*Trailer for Field Studies*

*Mobile AOP Unit*

*Field Study (Puerto Rico)*

*Zenon Unit (China)*

- West Virginia - Treatment Technology and Remote Access Implementation in Collaboration with:
  - McDowell County PSD
  - Region
  - Health Department
  - State
  - Residents

*EPA Provided Ultrafiltration System*

*Remote Access*

- Washington D.C. - Remote Monitoring Network Implementation in Collaboration with:
  - DC Water and Sewer Authority (DCWASA)
  - Region
  - Other Agencies
  - Academia


*DC Remote Monitoring Network*

## Research Impact

- Operator Support Education and Collaboration
- Technology performance database
- Small Systems Handbook
- Multi-disciplinary intra/inter agency research collaborations